OPERATIONS MANUAL “B”

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MULTI CREW COOPERATION – MCC

FNPT II MCC

STANDARD OPERATING PROCEDURES

(SOP)

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03.01 Introduction

01.01 GENERAL

The aim of the course is to become proficient in multi-crew co-operation (MCC) in order to safely operate multi-pilot multi-engine aeroplanes.

1) The objectives of MCC training are optimum decision making, communication, division of tasks, use of checklists, mutual supervision, teamwork, and support throughout all phases of flight under normal, abnormal and emergency conditions. The training emphasises the development of non-technical skills applicable to working in a multi-crew environment.

2) The training will focus on teaching the basics on the functioning of crew members as a team in a multi-crew environment, not simply as a collection of technically competent individuals. Furthermore, the course provides opportunities to practice the skills that are necessary to be effective team leaders and members. This requires training exercises which include students as crew members in the PF and PNF (PM) roles.

3) Students will be made familiar with inter-personal interfaces and how to make best use of crew co-operation techniques and their personal and leadership styles in a way that fosters crew effectiveness. Students will be made aware that their behaviour during normal circumstances can have a powerful impact on crew functioning during high workload and stressful situations.

4) Research studies strongly suggest that behavioural changes in any environment cannot be accomplished in a short period even if the training is very well designed. Trainees need time, awareness, practice and feedback, and continual reinforcement to learn lessons that will endure. In order to be effective, multi-crew co-operation training is planned to be accomplished in several phases spread over a period of about two weeks for full time participants.

5) The contents of the basic MCC course covers theoretical knowledge training, practice and feedback in:

a) Interfaces (SHELL)

- examples of software, hardware, environment and liveware-liveware mismatches in practice

b) leadership/followership and authority

- managerial and supervisory skills
- assertiveness (Standing up for your rights)
- barriers
- cultural influence
- PF and PNF [PM] roles
- professionalism
- team responsibility

c) personality, attitude and motivation

- listening
- conflict resolution
- mediating
- critique (pre-flight analyses and planning, ongoing-review, postflight)
- team building

d) effective and clear communication during flight

- listening
- feedback
- standard phraseologies
- assertiveness
- participation
- flight techniques and cockpit procedures
- discipline

e) The use of checklists is of special importance for an orderly and safe conduct of the flights. Different philosophies have been developed for the use of checklists. Whichever philosophy is used depends on the complexity of the aircraft concerned, the situation presented, the flight crew composition, their operating experience and the operator's procedures as laid down in the Operations Manual Part A.

6) Supervision, information and support.

a) Any action in handling the aircraft should be performed by mutual supervision. The pilot responsible for the specific action or task (PF or PNF [PM]) should be advised when substantial deviations (flight path, aircraft configuration etc.) are observed.

b) Call-out procedures are essential, especially during take-off and approach, to indicate progress of the flight, systems status etc.

c) Operation of aircraft systems, setting of radios and navigation equipment etc. should not be performed without demand by the PF or without information to the PF and his confirmation..

7) The exercises will be accomplished in a simulated commercial air transport environment. The instructions cover the following areas:

a) pre-flight preparation including documentation, and computation of take-off performance data;

b) pre-flight checks including radio and navigation equipment checks and setting;

c) before take-off checks including powerplant checks, and take-off briefing by PF;

d) normal take-offs with different flap settings, tasks of PF and PNF [PM], call-outs;

e) rejected take-offs; crosswind take-offs; take-offs at maximum take-off mass; engine failure after V1;

f) normal and abnormal operation of aircraft systems, use of checklists;

g) selected emergency procedures to include engine failure and fire, smoke control and removal, windshear during take-off and landing, emergency descent, incapacitation of a flight crew member;

h) early recognition of and reaction on approaching stall in differing aircraft configurations;

i) instrument flight procedures including holding procedures; precision approaches using raw navigation data, flight director and automatic pilot, one engine simulated inoperative approaches, non-precision and circling approaches, approach briefing by PF, setting of navigation equipment, call-out procedures during approaches; computation of approach and landing data;

j) go-arounds; normal and with one engine inoperative, transition from instrument to visual flight on reaching decision height or minimum descent height/altitude.

k) landings, normal, crosswind and with one engine inoperative, transition from instrument to visual flight on reaching decision height or minimum descent height/altitude.

8) No matter how effective the classroom curriculum, interpersonal drills, LOFT exercises, and feedback techniques are, a single exposure during the multi-crew co-operation course for the initial issue of a multi-pilot aeroplane type rating will be insufficient. The attitudes and influences which contribute to ineffective crew co-ordination are ubiquitous (constantly encountered) and may develop over a pilot's lifetime. Thus it will be necessary that the training of non-technical skills will be an integral part of all recurrent training for revalidation of a multi-pilot aeroplane type rating as well as of the training for the issue of further multi-pilot type ratings.

01.02 INSTRUCTOR NOTES

Jet flying is **attitude flying**:

Small deviations, big troubles, e. g. +2°-aircraft nose up (ANU) at M 0,75 lead to a climb rate of abt. 1.500 ft/min! Within 40 seconds you cross the opposite level, distracted and in a GPS-accuracy environment …

Higher **speeds and altitudes** need more attention:

Speeds above about M .75 are called transonic, as parts of the airplane are surrounded by an airflow at or exceeding M 1.0 (critical mach number) and therefore are subject to aerodynamic changes. High altitudes are good for fuel consumption, but what about decompression, radiation, ...

Jet engines need **anticipation** and even more **system knowledge**:

Jet engine respond time killed more than one pilot in the beginning of the jet age. Turbines take their time to spool up, produce thrust and accelerate the airplane, which you might have or not ...

The second pilot in our **multi crew cockpits**:

He/She is essential in our highly automated and complex cockpit environment plus the ever growing dense air traffic. Abnormal and Emergency situations in a single-pilot cockpit are hardly to non manageable.

The **main goal** of this course is to learn how to safely handle a turbine powered plane in a two crew member cockpit, as this will be your future. Two pilots will be needed in commercial aviation for an unknown long time as redundancy is a requirement for the safe operation in aviation. Even Airbus Industries is not advertising the easiness of a pilots job flying their highly sophisticated and automated aircraft anymore, and they know why!

During this course you will improve your instrument flying skills and you will learn how to correctly set priorities in standard and some predefined abnormal and emergency situations. Best use of the equipment will make your job easier, and that does include the efficient cooperation with the second pilot.

For a **successful completion** of this MCC-course we would like to point out, that beside the pilot license, there are some prerequisites. Your abilities in instrument flying are crucial, as there is no time to train basic IFR. But if you feel the need for a brush-up, we will be happy to arrange some sessions IFR refresher beforehand. Fine tuning of your skills in addition to the courses goal is us a pleasure. With the information you hold in your hands came the SOP for the MCC, including outlines for the use of the flight director and autopilot modes, a cockpit layout, so you find the knobs and switches and the session plan. Make yourself comfortable with the checklists (for abnormal and emergency cases we use the QRH = Quick Reference Handbook). Checklists are our daily business! But don't forget common sense!

Attitude control is combined with thrust/power and configuration to a resulting speed.

ATTITUDE – THRUST/POWER – SPEED

To maintain a constant altitude or glidepath you need a steady pitch attitude and a fix power setting for a constant speed (see exercise for the pitch power table during session 1.

Methods of manual flying are method I (M I), that calls for one hand at the controls and the other one on the throttles, for flight phases where airspeed is controlled by power. The pitch attitude is used to establish or maintain the vertical flight path. Method II (M II) requires both hands at the controls and a fix power setting. The pitch attitude is used to control airspeed.

M I is used during step descent on a non-precision approach, on final approach, ...
M II will be the right choice on initial climb out due to a fix power setting and the small speed band (V_2 to V_2 +10 Jet / V_2 to +15 Turboprop), during a constant speed descent as for ATC reasons, …

Note: Take care, not to use the electrical trim or trim wheel to make pitch corrections, as the reaction will be behind your plans and overcorrecting would occur. Just trim the forces on the control column to zero, after completion of your corrections.

How to become the perfect FO

Keep emotions low. You are the first officer, not yet the one with the FULL responsibility and therefore you may keep pressure a little further away from you than your Captain. "Think about it and talk with your MCC instructor about your feelings concerning this statement.
In an abnormal/emergency situation you will have three phases to handle.

1) Assessment phase: This phase is extensively trained throughout initial, advanced and recurrent training.

"Identify, Verify => Power - Performance – Analysis"

2) Action phase: The other phase with a lot of experience by training at all levels

"Action"

3) Management Phase: The CRM-phase. Only a few day's theoretical training using artificial situations created by instructors without the use of "in-flight emotions". LOFT sessions are all you get throughout your training as it would be very time consuming to play a full situation.

"FORDEC"

Excerpt from the management phase (Be aware, not all these items can be handled sequentially!):

WX	**NOTAMS**	**CHARTS**	**FUEL**	**ATC**
Cabin	Ground	Ops control	Routing	Duty time
Passenger handling		Crew accommodation		Deterioration

Now another essential point:

80% of all total losses are finally due to inadequate and insufficient pilots training! Typeratings who take an applicant through highly sophisticated systems within four weeks, or even less, including a minimum number of simulator sessions lack some essential parts of training, keep that in mind if you are confronted with such "cost saving" training.

Good airmanship is needed in many situations, not only abnormal and emergency ones. But this needs a solid basis. Thorough initial and advanced training combined with a permanent reevaluated recurrent training (LOFT, CRM, line checks, …) is the key to your future as a pilot.

01.03 Abbreviations/Terms

PF Pilot Flying

PNF Pilot Non Flying

PM Pilot Monitoring (often called “pilot not flying – PNF”)

CM1 Commander (Left Seat)

CM2 First Officer (Right Seat)

bCM both flight crew members

☺ Just for info

Explanation for the use of PM instead of PNF at some companies: The reason to use this rather new term is that the PM shall monitor the PF and speak up in case of any deviation from SOP or when an aircraft system deteriorates without PF notifying PM. The term pilot-non-flying does incorporate “do not interfere with flying”, which is not desired.

AAL	Above Aerodrome Level	AGL	Above Ground Level
ALT	Altitude	ALT SEL	Altitude Select
ANU	Aircraft Nose Up	AP	Autopilot
APT	Airport	ASI	Air Speed Indicator
ATC	Air Traffic Control	ATIS	Automatic Traffic Information Service
C/A	Cabin Attendant	CAT	Category
CLR	Clearance	DA	Decision Altitude
DH	Decision Height	DME	Distance Measuring Equipment
EFC	Expect Further Clearance	EFIS	Electronic Flight Information System
EO-SID	Engine Out - Standard Instrument Departure	ETA	Estimated Time of Arrival
FA	Flight Attendant	FAF	Final Approach Fix
FAP	Final Approach Point	FCU	Flight Control Unit
FD	Flight Director	FMA	Flight Mode Annunciator
FMS	Flight Management System	G/A	Go Around
GND	Ground	GP	Glide Path
GS	Glide Slope	GS	Ground Speed
HDG	Heading	HIRO	High Intensity Runway Operation
IAF	Initial Approach Fix	IAS	Indicated Air Speed
ILS	Instrument Landing System	IMC	Instrument Meteorological Condition
ITT	Inter Turbine Temperature	KIAS	Knots Indicated Air Speed
LOC	Localizer	MAPt	Missed Approach Point

MCC	Multi Crew Cooperation	MCT	Maximum Continous Thrust
MDA	Minimum Descent Altitude	MLS	Microwave Landing System
M_{MO}	Maximum mach number	MPA	Multi Pilot Airplane
MSA	Minimum Sector Altitude	MSL	Mean Sea Level
MTOM	Maximum certified Take Off Mass	N1	Low Pressure Turbine Rotor Speed
N2	High Pressure Turbine Rotor Speed	NAV	Navigation
ND	Navigation Display	OM	Outer Marker
OM-A	Operations Manual A	OM-B	Operations Manual B
OM-C	Operations Manual C	OM-D	Operations Manual D
PAR	Precision Approach Radar	PFD	Primary Flight Display
QFU	Magnetic Bearing of a runway	QRH	Quick Reference Handbook
RA	Radio Altitude	RA	Radio Altimeter
RMI	Radio Magnetic Indicator	ROC	Rate Of Climb
ROD	Rate Of Descent	RWY	Runway
SID	Standard Instrument Departure	SOP	Standard Operating Procedure
SPA	Single Pilot Airplane	STAR	Standard Terminal Arrival Route
STBY	Standby	TAS	True Air Speed
TC	Time Check	THR	Threshold
TOC	Top Of Climb	TOD	Top of Descent
TOM	Take Off Mass	V_1	Critical engine failure speed
V_2	Take-off climb speed (T/O safety speed)	V_a	Design manoeuvring speed
V_{fe}	Flap extended speed	V_{ga}	Go around speed
V_{le}	Landing gear extended speed	V_{lo}	Landing gear operating speed
VMC	Visual meteorological conditions	V_{mca}	Air minimum control speed
V_{mcg}	Ground minimum control speed	V_{mo}	Max operating limit speed
VOLMET	Meteorological information for aircraft	V_r	Rotating speed
V_S	Stalling speed in clean configuration	V_{so}	Stall speed in landing configuration
V_{sse}	Minimum intentional single engine speed	V_x	Speed for best angle of climb
V_{xse}	Best speed for OEI angle of climb	V_y	Speed for best rate of climb
V_{yse}	Best speed for OEI rate of climb	WX	Weather
Y/D	Yaw Damper		

01.04 Closed loop concept

In order to keep all flight crew members updated at any time, the closed loop concept has been used for a long time now. Whenever a pilot sets an action, he informs the other crew member(s) ahead of the action by a specific callout. We differ two ways of the closed loop, the standard (closed) loop and the short loop.

The **standard (closed) loop** means, that an action will be ordered by one and handled by the other crew member, e. g. “Flaps 1”. The corresponding response is: “Flaps 1”, after having checked the parameters like speed, altitude, … When the change has been confirmed by the respective indications, the callout by the handling pilot is: “Flaps are 1”. The ordering pilot checks the condition to be as ordered and calls: “Checked”, thereby closing the loop. In case of wrong parameters for the ordered action like too low/high speed for a configuration change, the handling pilot has to call the deviation, e.g. “Too low/high speed”.

Short loop stands for the action to be done by the PF and to be checked only by the PNF [PM]. The PF has to check the parameters and calls e.g. “FL 180 armed”. The PNF [PM] checks the parameters, calls any deviation and confirms the completed action after checking the respective indications by calling “checked”.

Sometimes it is obvious enough to suspend the callout “checked”, than it has been omitted in the summary. One case is the gear up order, as the green and red lights are obvious. The flaps indication however is too small to be called obvious information. Different airlines reduce this crosscheck callouts to a very low minimum, but this is only possible due to the high state of automatic redundant systems in our sophisticated airliners like the B 777/B747-400/A320/A330 and so on.

01.05 Flight control – Hand over/Take-over

If a handover is intended, the PF must clearly call

“You have control”

And the PNF [PM] has to takeover controls and respond

“I have control”

For a necessary takeover it’s the other way around. When using FD/AP this has to be accompanied by switching the FD priority to the other side (see 03.21 Operation of FD/AP).

Note: If a handover is intended for a short period of time, e.g. to provide a briefing or to go to the toilet, the handover is just one way, that means no takeover of the PNF [PM] duties by the PF and vice versa. Whenever handing over controls, e.g. for takeoff or a low visibility approach, the handover does include a change of duties.

01.06 FMA

The PF **sets** or **orders** the required modes of operation and values, depending on situation and workload, adhering to the closed loop concept. It is recommended to order FCU inputs when the autopilot is off to reduce workload and the chance of errors to be made.
Always ask yourself what you expect the aircraft to do when manipulating the FCU and how to verify the result.

All manipulations must be checked against their indication on the PFD and the FMA.

More details about the FD/AP system handling at 03.21 Operation of FD/AP.

01.07 CHECKLISTWORK

All **Checklists**, except “Flight Deck Preparation”, shall be carried out on order by the CM1/PF according to the by heart concept (engine start, …), the read and do or the challenge and response concept (most of the ground/flight and abnormal/emergency checklists) depending the assistance by the other crewmember.
Scan flow checklist: Do the handling by memory, than check the result for each item against the corresponding checklist item. This kind of checklist work will not be used during MCC training, as we want to avoid memorization of our customized procedures in order not to interfere with your following type rating.

Usually, checklists are handled by the CM2 when the airplane is on the ground and by the pilot flying/monitoring (PNF [PM]) when the airplane is in flight. Upon completion of a checklist callout "... checklist completed".

The **PF must order** any change in configuration (gear or flaps) and the PNF [PM] responds e. g.: „FLAPS ARE 1“, when flap position indicator shows the corresponding value.
It is the duty of the PF to order any checklist as well as to provide the DEPARTURE and the APPROACH BRIEFING in time.

The pilot responsible for the checklist shall read the checklist in a clear and brief manner. If an item can not be carried out right away the checklist shall normally be held at this point and shall be placed at a prominent place. However if the PIC decides to continue with the checklist due to e.g. an ATC clearance, the checklist shall not be stowed before the whole section is completed. Open items on a checklist are vulnerable for being missed, therefore pay special attention in such a case.

When the checklist is read, the pilot responsible for the respective item shall respond to the challenge. The response shall be made by using the words printed on the checklist, after the required action has been completed and the result checked.

As soon as an abnormal/emergency checklist is completed, the flight crew members shall update each other. What happened, course of action, …

By Heart items must be applied as stated in the emergency checklist, without reference to the checklist, but still need to be rechecked when reading the paper checklist.

Good communication is assured by using standard call outs and terminology. Also keep your fellow pilot in the loop by informing him about your intentions and actions according to the “CLOSED LOOP” concept. Inform your fellow crew member(s) ahead of action, by use of the wording “non-standard” in time, when you decide to do something outside the SOP’s like ordering gear down early and ahead of Flaps 1, to increase drag while intercepting the glideslope from above.

01.08 Handling of COMM/NAV equipment

In order to standardize our cockpit configuration as much as possible, the normal procedure shall be to use the VHF - COM 1 for ATC and VHF - COM 2 for company, ATIS, 121.5 etc.. Radio communications will normally be handled by the CM 2 on the ground and by the PNF [PM] in the air.

01.09 AIRCRAFT LIGHTING

Navigation lights on	As soon as Electrical Power is in use	CM2
Beacon	Prior to start-up	CM2
Taxi light on	When taxi clearance is received When holding, switch taxi lights off in order to let airport vehicles pass in front of you and switch them back on when you get the clearance to continue taxi	CM1
Strobe & Landing lights on	When line-up clearance received and RWY is to be entered	CM2
Taxi light off	After setting climb power	PF
Landing lights off Landing lights on	Passing 10.000 ft (Climb) Passing 10.000 ft (Descent)	PF PF
Taxi Light on	Cleared to land	PF
Strobe & Landing lights off	Vacating the RWY	CM2
Taxi light off	Entering parking position	CM1
Beacon off	After Engine Shutdown	CM1

NOTE:
Use of landing lights in fog:

- *When taking off/landing in reduced visibility, especially in fog, the use of landing lights may cause reduced forward visibility, due to a blinding effect. It may also lead to disorientation.*
- *The use of landing lights in conditions with very low visibility is not recommended.*
- *During VFR climb and descent it is critical that both crew members maintain a careful lookout for traffic, especially in terminal areas. In such a case, switching on of the landing lights is highly recommended.*

01.10 AIRCRAFT CATEGORY

The Beech 200 turbo-propeller aircraft is categorized as a CAT B aircraft. Below you will find the different procedural speed bands of this category for your better understanding and correct use of the Instrument Approach and Landing charts (IAL). The basis is 1.3 times stall speed in landing configuration at maximum certified landing mass. Master is V_{TH}

ACFT CAT	V_{TH} IAS at THR	Range of IAS for Initial incl Reversal and Racetrack	Range of Final APCH IAS	MAX IAS for Visual Manoeuvring (Circling)	MAX IAS for Missed APCH	
					Intermediate Phase	Final Phase
A	up to 91	90-150 (110)*	70-100	100	100	110
B	91 -120	120-180	85-130	135	130	150
C	121 -140	160-240	115-160	180	160	240
D	141 -165	185-250	130-185	205	185	265
* Maximum speed for reversal and racetrack procedures						

03.02 Flight Deck Preparation

02.01 GENERAL

Interior Check ☺
The interior preflight check includes a physical check of the aircraft safety equipment (i.e. fire extinguishers, PBE´s, first aid kits, axe, etc.).

The goal of the preflight procedure is the determination of the aircraft's operational status. All necessary paperwork, documentation and publications should be checked.

02.02 FLIGHT DECK PREPARATION - Simulator

The entire FLIGHT DECK PREPARATION checklist has to be executed by order of the instructor.

When completed, or at a time specified by ATC, call for the ATC clearance:

Switch on the avionics master switch, select the appropriate frequency and call e.g.: "VIE Delivery, FLIGHT TRAINING 01D, position 72, information A, request clearance to Linz".

02.03 CREW AT STATION

After the flight deck preparation is completed, the CM1 calls for the crew at stations checklist.

Climb performance two engine/one engine inoperative (OEI): check & note [CM 2]

After receiving the load sheet:
Upon completing the pre-flight checks, the T/O data should be rechecked by the CM2 to confirm the correct **speeds (V_1, V_R, V_2 and climb out speed**). Thereafter the PF should review the departure procedures and also the emergency procedures to be followed for a rejected T/O prior to V_1, or a continued T/O at or after V_1.

03.03 Start up

03.01 GENERAL

CM 1 switches on the avionics master switch and orders: "Call for start up". CM 2 selects the appropriate frequency and calls e.g.: "VIE ground, FLIGHT TRAINING 01D, position 72, request start-up".

When COCKPIT PREPARATION and CREW AT STATIONS are completed, start with the BEFORE ENGINE START checklist, whenever ready and cleared for engine start.

Phase	CM1	CM2
When ready	**"Request Start Up"** **"BEFORE ENGINE START"**	Request start-up clearance from ATC **"Cleared for engine start"** Perform the **BEFORE ENGINE START** Checklist **"BEFORE ENGINE START CHECKLIST COMPLETED"**

03.02 ENGINE START

When the Before Start Checklist is completed and the marshaller shows the engine clear signal, the CM1 will start the engines - according the engine start procedures described in the expanded checklist.

Limit: ITT – max 1.000°C (for 5 sec)

03.03 AFTER ENGINE START

After starting both engines and with all indications stable, CM1 orders the removal of all ground equipment if connected and orders the "AFTER ENGINE START" checklist.

After removal of the ground equipment, the marshaller shows the all clear signal (thumbs up).

03.04 Departure Briefing

The crew briefing initiated by CM1 should include clear directions for the planned flight. It should be the point where all questions relevant to the flight are answered to avoid confusion or miscommunication between the pilots.

The briefing is not limited to, but shall include:

Standard Departure Briefing

The PF briefs the Departure

Name of the SID
Departure route (*text*)
Initial climb restrictions (minimum and maximum altitudes, MSA, gradients, …)
Radio and NAV setting
Extras (WX, Hazards, Anti-Ice, ...)

Additionally it has to include a briefing for malfunctions, e. g.:

In case of an engine failure, fire or any serious malfunction before … kts (V_1) You or I call stop, you apply full brakes and reverse, I check for abnormalities, especially the engine instruments. After V_1 I continue, minimum speed is V_2 to V_{2+15} I climb to acceleration altitude/1.500 ft AGL/x.xxx ft and follow the contingency procedure which is …/the SID (minimum gradient to be checked!). In case of uncontrolled fire I continue left/right for an immediate landing on runway yy, you check/set cabin pressurization for landing and provide the approach speeds. I fly, my mayday call and further communication, you perform the corresponding checklist on my order.

Before the briefing the PF shall complete the radio and NAV setup as far as possible and check the setting together with the PNF [PM] at the end of the briefing.

Radio and NAV setting (Standard)

a) NAV 1 + 2 active	VOR freq. used in the SID
b) NAV 1 + 2 pre select	VOR freq. acc. to engine failure procedure
c) DME hold frequency	APT DME or the DME used in the SID
d) ADF 1 active	Enroute NDB frequency
e) ADF 1 pre select	LOM freq. of the landing runway
f) Course pointer	Initial course in the SID
g) HDG BUG	Departure rwy heading / first track
h) ALT pre select	Initial climb restriction: SID or ATC CLR
i) RMI pointers (RMI)	as required

03.05 Taxi

05.01 GENERAL

Taxiing shall be done by the CM 1.

Phase	CM1	CM2
When commencing taxi and free of obstacles	**"Request Taxi"** - Clear left side - Switch Taxi light on **"Taxi Check"**	- Obtain taxi clearance - Clear right side **"Right side clear, cleared to taxi"** Perform the **TAXI Checklist** during taxi, when clear of conflicting aircraft or vehicles and permanent checking of position is not required. **"Taxi Check completed"**

Taxiing will be done at a consistent speed for passenger comfort and ramp conditions (maximum taxi speed is recommended at 30 kts straight ahead and 15 kts in turns [10 kts if wet]).
To stop or slow down, the primary means are propeller beta range before using the brakes.
Turns are by rudder pedal with assistance of propeller beta range on inside engine.
☺ Wait until: "Cabin is ready for T/O".

Perform "Before Take off checklist"

05.02 LINE UP

When the Flight Director System and/or the auto pilot systems are to be used, they shall be set and selected for the PF.
Before entering the runway, the respective pilot checks the approach sector to be free (Callout: "Approach sector is clear"), the runway has to be identified ("RWY xx identified") and the heading checked (QFU).
It's the right time for a short look at the next windsock, with a call what wind you expect during T/O roll.
Be aware of different regulations, like the FAR which allow the strobe lights to be switched on when being airborne (e. g. use of the automatic system).
Don't waste runway on line-up, but also avoid backtrack short distances in high intensity runway operation (HIRO).

Reminder:
- *Altimeter settings/changes are to be called out and cross checked (incl. STBY Alt.).*
- *On positioning of the aircraft for T/O, both pilots have to check the approach sector, identify the correct RWY, check FMA annunciation and note taxi fuel used (FF * taxitime).*

03.06 Takeoff and initial climb

06.01 General

Before starting the takeoff roll, the crew will again reconsider the various operational and environmental factors which could affect the takeoff. Such factors are runway length and surface condition, wind, obstructions and anything else that could affect safety. Call out any changes to the briefed situation, include operational considerations

NOTE:
If the Runway is wet with standing water patches, heavy precipitation, bird migration, or when ice build up is expected, continuous ignition must be selected for take off.
Icing conditions exist at a temperature of +10° C or below **and** visible moisture, in any form. At +6° C and below combined with a spread of 3° or less it is very likely.

06.02 Rolling Takeoff

A rolling take-off may be started upon entering the runway. Power shall not be increased before the airplane is aligned with the runway centerline, as any acceleration out of a turn or a combination of high power setting and braking shall be avoided.

06.03 Standing Takeoff

A **Standing Takeoff** shall be performed when:

- Visibility / RVR is at or close to take - off minimum
- Actual TOM is near limiting MTOM for runway length or obstacle clearance
- Contaminated RWY

The aircraft shall be lined up, stopped and the engines must be accelerated to take - off power before releasing the brakes.
For a crosswind takeoff the controls should be displaced accordingly and rudder input used to keep the aircraft aligned with the centerline of the runway during the takeoff roll. Once airborne the aircraft should be allowed to crab into the wind so that the flight path follows the extended runway centerline. For instrument departures comply with the assigned altitudes and headings/tracks as provided by SID/ATC (terrain clearance and/or noise abatement).
In case of an engine failure comply with the takeoff and climb profile for the Contingency Procedure (SID, EO-SID or as briefed).

Minimum autopilot engagement altitude is 500ft AAL. Verify the required AP/FD modes (HDG, NAV, ALT ARM with corresponding clearance in altitude readout, GA) to be set/selected/armed/engaged properly before switching on the auto pilot.

Note: T/O performance tables are based on standing T/O.

COMMON ERRORS:

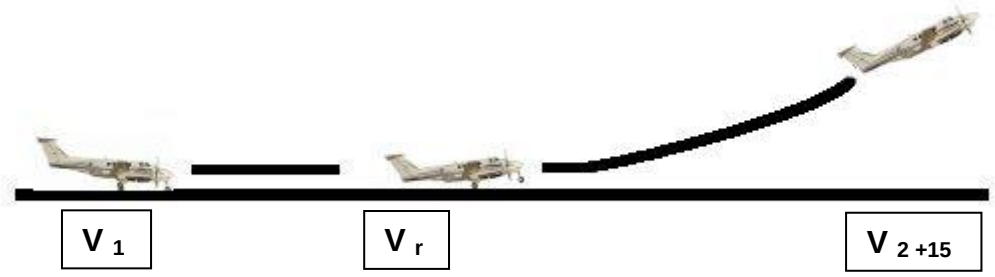
- Too much RWY used to align aircraft in take off position,
- RWY not identified
- Setting take off power too early
- Late start of take off roll in HIRO environment
- Rotating too early or too late
- Rotating too fast or too slow (3° per second is standard)
- Rotation to a too low attitude, resulting in excessive speed but also a loss of terrain clearance!
- Wrong flap setting (e. g. after RWY changes)

06.04 TAKEOFF PROFILE AND INITIAL CLIMB

The takeoff profile is intended to satisfy the procedural requirements for a normal takeoff and initial instrument climb. Some airports may have special procedures which require modification of this profile due to terrain, noise abatement or traffic from adjacent airfields.

4. Accelerate to Cruise Climb Speed (or max Climb Speed)

3. At acceleration altitude (1500 ft AGL or as briefed). Decrease pitch attitude, accelerate through flap retraction schedule set climb power



3. At V_R rotate smoothly (3° per second) to a nose up attitude (Normal 10° to 12°) to reach V_2 + 15 knots at max. Pitch 15° (further speed increase is permitted)

4. Positive rate of climb-gear up

Flap Retraction Airspeed Schedule

Flap 0 = v > V_{REF} (V_2) + 15

Normal Take Off / CM2 is PF (standard during MCC)

Phase	CM1 / PNF [PM]	CM2 / PF
At Takeoff Position	**"READY ?"** **"YOU HAVE CONTROL"** Advance the power levers slowly to approx. 400 – 600 lbs torque	**"READY"** **"I HAVE CONTROL"** **"SET T/O POWER"**
<u>T/O power:</u> Power: T/O RPM: 2000 Torque: 2230 ITT: 800°C N1: 101,5 Oil: 55 - 99°	□ adjusts T/O-Power, monitors engine instruments and calls "**T/O POWER SET"** □ keeps the right hand on the power levers until V_1 (in case of take off abortion) thereafter no hand shall be on the throttles Monitor essential engine and flight instruments and call out any abnormality.	□ applies light forward pressure on the control wheel up to 40 kts to keep the nose-wheel on ground and little aileron deflection into the wind, if applicable. □ maintain directional control by use of rudder
At 60 KTS	Check speed indication and call out **"60 KTS"**	Check ASI indicating 60 kts and call out **"CHECKED"**
At V_1/ V_r / V_2	Call out "**V1**", "**ROTATE**", "**V2**" at appropriate speeds	- at V_r rotate to the T/O-attitude (~ 10° ANU) at approx. 3°/sec - speed V_2 - V_2+15 kts max. 15° ANU (Normally 10 to 12° ANU)

□ *If the "sixty" callout is not acknowledged a second call ("70 but max.80") shall be made. If this second call is not acknowledged PNF [PM] shall reject the take off (due to suspected Pilots incapacitation).*

06.05 Normal Takeoff / CM1 is PF

Phase	CM1 / PF	CM2 / PNF [PM]
At Takeoff position	**"READY?"** **" I HAVE CONTROL"** Advance the power levers slowly to approx. 400 – 600 lbs torque **"SET T/O POWER"** □ applies light forward pressure on the control wheel and little aileron deflection into the wind □ maintain directional control by use of rudder CM 1 keeps the hand on the power levers until V_1 (in case of a take off abortion) thereafter no hand shall be on the throttles.	**"READY"** **"YOU HAVE CONTROL"** □adjusts T/O-power, monitors engine instruments and calls "**T/O POWER SET"** T/O power: Power: T/O RPM: 2000 Torque: 2230 ft-lbs (graph!) ITT: 800°C N1: 101,5 (38.100 RPM) Oil: 55° - 99 ° C
At 60 KTS	□ check ASI indicating 60 kts and call out **"CHECKED"**	- Monitor essential engine and flight instruments and call out any abnormality. □ Check speed indication and call out **"60 KTS"**
At V_1 / V_r / V_2	□ at/after V_1 both hands on controls □ at V_r rotate to the T/O-attitude (~ 10° ANU) at approx. 3°/sec □ speed V_2 - V_2+15 kts max. 15° ANU (Normally 10 to 12° ANU)	Call out "**V1**", "**ROTATE**", "**V2**" at appropriate speeds

03.07 Climb

07.01 After Lift-off on Initial Climb

Phase	PF	PNF [PM]
At positive ROC	□ check positive ROC **"POSITIVE RATE, GEAR UP"**	check positive ROC, select gear up, on gear up indication: **"GEAR IS UP "**
At 1500ft AAL or acceleration altitude	Normal acceleration 1500 ft AGL or as briefed - When climbing through **1500 ft** AGL accelerate to Climb speed and order: **„FLAPS 0"** "**SET CLIMB POWER**" No flap retraction during turn below V_{2+30}	□ check speed above V_2+15 kts □ select flaps 0, when indicated: **"FLAPS ARE 0"** Set climb power (2230 ft-lbs / 1900 RPM) and call out **„CLIMB POWER IS SET"**
Further climb-out	Continue acceleration to normal climb speed by lowering the nose while pushing the Pitch Sync button. Release the Pitch Sync when the new attitude is reached.	
At transition altitude Passing FL100	At transition altitude (change altimeters to 1013 hPa) **"STANDARD, FL ....."** on passing FL 100 or as appropriate, order **„CLIMB CHECK"**	At transition altitude (change altimeters to 1013 hPa) **"FL ……"** Perform climb check according check list and switch off the landing lights if not yet done by the PF **"CLIMB CHECK COMPLETED"**

NOTE:
□ *Adjust Power and Speed according climb-table.*

07.02 Climb procedures

Use climb speeds according table below:

Climb Power:	Power:	CLIMB
	Propeller:	1900 RPM
	Torque:	max. 2230 ft-lbs
	ITT:	max. 800° C

Climb speeds:	T/O	-	FL 100:	160 KIAS
	FL 100	-	FL 200:	140 KIAS
	FL 200	-	FL 250:	130 KIAS
	FL 250	-	FL 350:	120 KIAS

Note for silent cockpit concept: Do not perform cockpit paperwork below FL 100. Except Abnormal and Emergency checklist or as deemed necessary, e. g. lower enroute level.

The PF is expected to comply with all ATC instructions, SID or STAR procedures, and/or radar vectors in a timely manner. The PNF [PM] should establish and maintain two way radio communications with ATC and cross check compliance with the various departure (or arrival) procedures.

Step climb/descent (e.g. FD ON, AP OFF):
PF: “Disengage ALT, arm FL 120”
PNF/PM: Disengages ALT hold, arms new altitude. „FL 120 is armed“
PF: Checks ALT hold disengaged and new altitude armed. “Checked”

Altitude callouts: Whenever approaching an assigned altitude (1.000 ft before) in climb or descent call “Approaching x.000 ft/ FL yyy”

☺ The Fasten Seat Belt Signs are switched off at the discretion of the commander when no hazardous weather (TS, Clear Air Turbulence, ...) condition exist or are expected, but not below 10.000 ft.

03.08 Cruise

08.01 General

After reaching cruise altitude accelerate to intended cruise speed and set power according Cruise Performance Table.
Types of cruise speed are Normal Speed Cruise and Max Speed Cruise.

Phase	PF	PNF [PM]
When cruising level is reached	After Level off order **"CRUISE CHECK"**	Perform the **CRUISE** Checklist

Limits:

Torque:	2230 ft-lbs
ITT:	800°C
N1:	101,5% (38.100 RPM)
N2:	2000 RPM
Oil:	0 – 99 °C / 100 – 135 psi

Recommended flight levels have to be modified as required to adjust for head-/tailwind, high/low mass, poor engine performance at recommended cruise ITT setting, etc. With sufficient time left for passenger announcements and approach briefing, the weather for destination and alternates should be obtained early by the PNF [PM] (ATIS, VOLMET, INFO, …).

When navigating on conventional radials or tracks these should be called out by PF and confirmed by the PNF [PM].

It is duty of the **PNF [PM]** to gather information about the weather condition at all the airfields during flight, which are of interest for a possible alternate or emergency landing, as well as handling of all the paperwork (company flight plan, fuel used versus plan, aircraft papers, …)

☺ A passenger in-flight announcements usually provided by the PF should be done in a friendly and understandable manner (German and English except when known to be one language spoken in cabin, e. g. charter flights). Delays should be explained and apologized for with a short explanation. Don't use abbreviations like "CFMU".

NOTE:
☞When navigating conventional all Nav. frequencies are to be identified (compulsory for approach and departure); each pilot has to inform the other pilot about setting / changing the Navigation aids.
E.g." MUC VOR set and checked VHF - NAV 1"
Change over point is halfway between navigational aids or as published.

03.09 Descent

09.01 General

On request of the PF, the PNF [PM] will call ATC for descent clearance when approaching TOD.
Two Types of descent planning methods are standard in our operation: The **ROD descent** and the **3° glidepath descent**.

The normal ROD descent is based on 1500 ft/min rate of descent (Be 200 MCC).

3° glidepath descent planning: 3 NM/1000 ft (rule of thumb: "GS*10/2"). This is a guideline and shall be adjusted according the situation.

☺ *The seat belt sign should be switched on at the discretion of the Commander (recommended 15 – 20 min prior ETA). It is recommended to establish contact with C/A concerning time remaining to complete the cabin service (a speed reduction may be considered, if no sufficient time is left to secure the cabin in due time for landing).*

After receiving information about the expected approach at the destination the PF provides the

09.02 APPROACH BRIEFING.

a) Type of approach
b) Routing to final track incl. restrictions (speed, altitude)
c) Frequency of final NAV aid and final track
d) Final configuration
e) Final descent/GP intercept point
f) OM or FDP altitude (final descent point)
g) DA/DH or MDA
h) Missed Approach Point (non precision) and
Missed Approach Procedure (consider EO SID in engine out condition)
i) RWY – Length/lighting/condition (as applicable)
j) Threshold or field elevation
k) MSA (all MSA sectors, expected to be crossed) plus relevant MORAs
l) NAV setting, the term "Standard" may be used for the homebase or simple ILS RWYs

NAV-Equipment setting (Standard) => Final NAV Setup

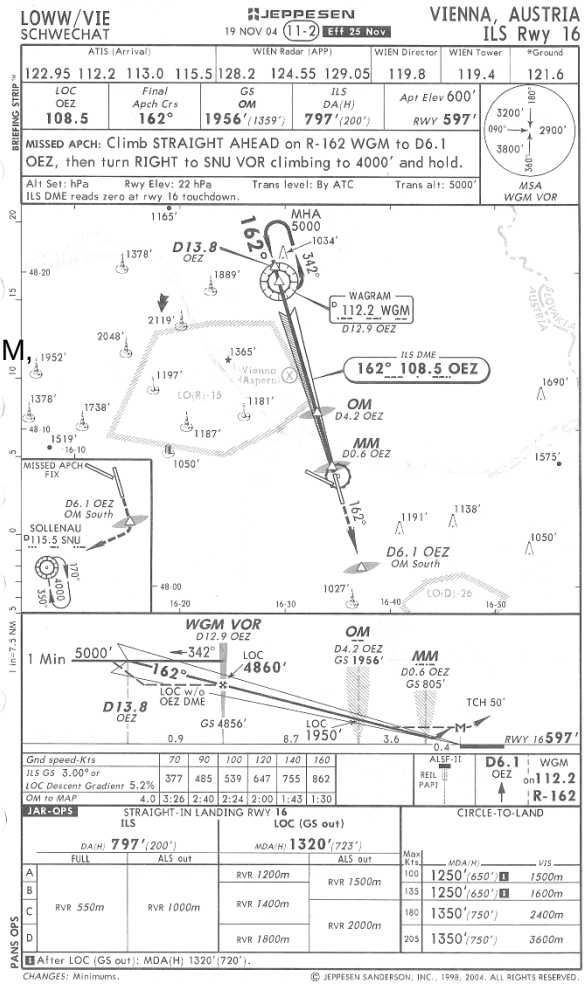
a)	NAV 1+2 active freq	ILS/VOR of landing runway
b)	NAV 1+2 pre-select freq	VOR for MAP, ILS for parallel RWY, …
c)	DME hold freq	Airport DME or ILS-DME
d)	ADF 1 active freq	LOM of landing runway
e)	ADF 1 pre-select	forward NDB when needed/MAP NDB
f)	Course pointer	Final track
g)	HDG-BUG	Landing runway heading
h)	RMI Pointer (ND/RMI)	ADF 1/optional
i)	Altitude cursor	DA or MDA
j)	Radio altitude cursor	minimum, or 150 ft on ILS / 300 ft on non-precision as reminder

Landing data are:
Current ATIS
Remaining trip fuel (= remaining fuel minus deviation and final reserve fuel)
Estimated landing weight
Runway: landing distance available versus landing distance required
Calculate V_{REF}, $V_{APP,}$

> *<u>Note:</u> When passing through 10.000 ft speed limit is 250 knots or as by ATC (trying to determine the airspace class is not advisable due to workload and known documentation deficiencies).*

e. g.

"ILS 16 VIE, chart 11-2, (when new: eff. 25 Nov 04)
Routing NORPA direct WGM
ILS freq 108.5, inbound track 162°
Final configuration Flaps Full, V_{APP} is 121 kts
GP intercept 5.000 ft at D 13,8 OEZ
OM altitude is 1.956 ft
Minimum is 797 ft
RWY length is checked, 1.200 m margin
MSA out of WGM VOR to east 2.900 ft, to SW 3.800 ft
Missed approach: Climb straight ahead on radial 162 WGM, at DME 6.1 OEZ turn right to SNU climbing 4.000 ft and hold



Final NAV-setup:
VHF NAV 1 ILS OEZ 108.5 track 162, standby WGM
VHF NAV 2 ILS OEZ 108.5 track 162, standby SNU
DME hold freq OEZ 108.5
ADF 1 WO 303, in case of a runway change
ADF 1 pre-select BRK 408
HDG-BUG 162°
RMI VHF NAV 1
DH is set 150 ft as a safety gate

Phase	PF	PNF [PM]
Before TOD		□ Current ATIS info □ Remaining trip fuel (= remaining fuel minus deviation fuel minus final reserve fuel) □ Estimate landing weight □ Runway: landing distance avbl. □ Calculate VREF, VAPP,
On start of descent	**"DESCENT CHECK"**	□ Perform the DESCENT CHECK **"DESCENT CHECK COMPLETED"**
Latest at transition level	**"Altimeters"** **QNH .....; ..... ft"**	□ Perform altimeter setting **"QNH .....; ..... ft"**

NOTE:
□ *For IMC-approaches in mountainous terrain and visual approaches in darkness the WX-radar shall be turned on, unless an E-GPWS is provided.*

03.10 Holding

10.01 General

Reduce speed early enough to enter the holding at or below maximum holding speed for category of aircraft. Power setting according to the holding table (800 ft-lbs/1700 RPM).

If entering a holding set inbound course and check inbound distance. Outside radar coverage, or when ordered by ATC report holding entrance. Try to obtain an EFC.

In icing conditions the recommended holding speed is 160 kts.

Comply with procedural speeds or as per ATC with due regard to their limitations and your knowledge and acceptance of them.

03.11 Approach

11.01 General

The PNF [PM] shall monitor the performance of the PF and call out any deviation from standard (deviating final approach speed by +10 Kts or –5 Kts, tracks on tendency towards half scale deflection)

During approach an incapacitation check is mandatory. The callout “500” is done by the PF at 500 feet above ground (RA) and confirmed by the PNF [PM] with “Checked”.

Note: For ATC reasons (other jet traffic) in our operational environment the standard speed on starting an approach is assumed to be 160 kts.

11.02 Final NAV setup

When being radar vectored or at the appropriate position on the published approach the PF shall call for the “Final NAV setting”. PNF [PM] shall do the switching according to the approach briefing, identify the ILS, VOR, NDB’s and announce: “Final NAV setting completed”.
The setting and identification can be done in advance, if the respective NAV equipment is not needed for own lineup or for orientation during radar vectoring.

On all instrument approaches regardless of the minimum, execute an immediate missed approach:

- When an instrument cross check shows significant disagreement and visual contact has not been established.
- Below 1.000 ft, if deviations are in access of
    - localizer ..... 1 dot right or left
    - glide slope ..... 1 dot below or above
    - track (VOR/NDB)…….. 5° right or left (except passing station)
    - descent rate ..... excessive (> 1.000 ft ROD)

In strong and gusty wind conditions it is advisable to increase the V_{REF} by 0.5 times the gust value exceeding 5 kts, but limited to max 15 kts increment.

The actual touchdown is on the main gear with a slightly nose-up attitude. After the nose gear is lowered to the RWY the PF applies wheel brakes as necessary and operates the Propellers to Beta Range/Reverse.

11.03 Approach considerations

Elements of a stabilized approach (IMC below 1.000 ft/VMC below 500 ft)

- On track (max. half scale deflection on standard ILS LOC, within expanded localizer band on Cat II and Cat III, ± 5° on VOR/NDB track, on circling approaches wings level latest 300 ft above threshold elevation)
- On glidepath (max. half scale deflection on standard ILS GS, not below minimum altitudes, maximum descent rate of 1.000 ft/min or as specially briefed)
- Correct configuration for landing
- Correct speed (+ 20 kts/- 0 kts)
- Appropriate power setting (for the existing configuration, not below minimum power according operating manual)
- All checklists and briefings completed

03.12 Types of approach

12.01 General

In general we differ between precision (ILS/PAR/MLS) and non precision approaches (LOC/VOR/NDB/SRE). These types can be flown as stabilized approach with final configuration when established on inbound track and starting final descent or as decelerated approach with final configuration to be set on glidepath/final descent to reach 1.000 ft AGL fully established.

12.02 ILS Approach

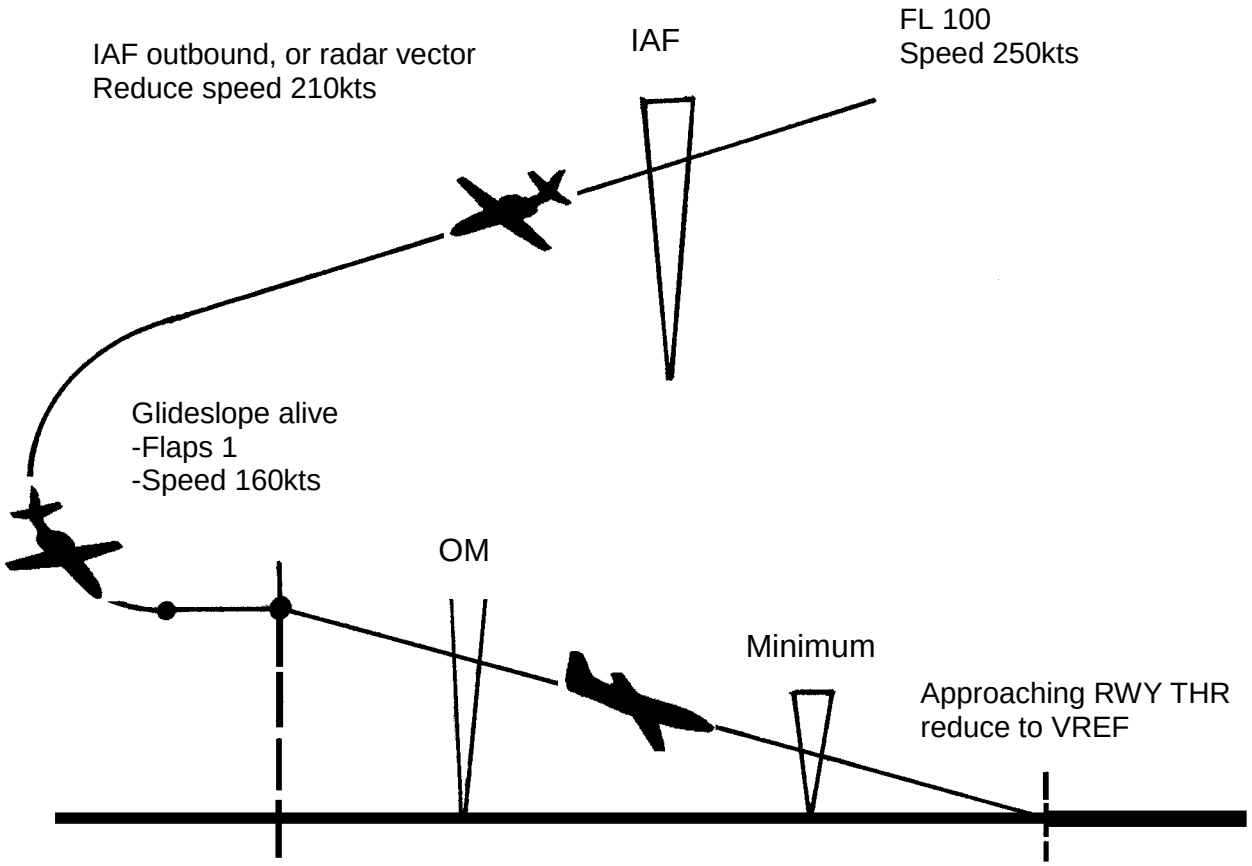
As an example, the Procedures and the Wording for a radar vectored ILS APP (see also AP/FD modes and callouts).

Phase	PF	PNF [PM]
IAF outbound	□ Reduce speed 210KTS	
- On heading/RV to intercept final track order:	**"FINAL NAV SETUP"**	□ Perform **"FINAL NAV SETUP COMPLETED"**
LOC alive On LOC capture (AP OFF)	**"LOC ALIVE "** *(On APPROACH COUPLED)* **"LOC COUPLED "** **"SET HEADING BUG ON FINAL"**	**"CHECKED"** **"CHECKED"** □ Perform **"HEADING BUG SET"**
GS alive	**"GS ALIVE"** **"FLAPS 1"** □ Reduce speed 160 KTS (ATC convenient flow speed)	**"CHECKED"** □ check speed below 200 kts and select flaps 1, when flap position indicator shows Flap 1: **"FLAPS 1 SET"**
GS captured	**"GS CAPTURE"** **"PRESELECT G/A ALTITUDE"**	**"CHECKED"** □ set G/A altitude **"XXXX FT IS PRESELECTED"**
In time to be established at 1.000 ft. AAL	□ approx. 1500 ft AGL, check speed below 181 kts, order: **"GEAR DOWN"**	□ Check speed below 181 kts, perform**,** when three greens: **"GEAR IS DOWN "**

	Check speed below 157 kts, order **"FLAPS FULL"** **"SPEED Vref +5"** ⇦Reduce to final approach speed	- Check speed below 157 kts, perform, when flap position indicator shows full: **"FLAPS FULL SET"**
Passing OM	**"OUTERMARKER"**	□ start timing, check altitude vs OM altitude, check speed and callout: **"MINIMUM IS XXX FT OUTERMARKER CHECK COMPLETED"**
	"FINAL CHECK"	Perform the **FINAL** Checklist **"FINAL CHECK COMPLETED"**

At 500ft RA	**"500"**	**"Checked"**
100ft above minimum at minimum	**"APPROACHING MINIMUM"** **"MINIMUM"**	□ Lookout for Approach lights, RWY lights or RWY
if sufficient visual reference available	**"LANDING"** □ continue to land	**"APPROACH LIGHTS / RWY IN SIGHT"** □ return to instruments down to landing and call out any deviation/ abnormalities
If no sufficient visual reference available	**"GO AROUND"** □ Perform duties for go around	**"NO CONTACT"** □ Perform duties for go around

Typical ILS Approach



Approaching 1500 ft AGL
- Gear down
- Flaps FULL
- Speed VREF + 10 kts + Gustfactor
- Final Checklist

THR (at ~35 - 50ft)
- Landing assured
- Power idle (~30 ft)

Note: In gusty wind conditions increase VREF by half of wind factor in excess of 5kts, max 15 kts increment.

12.03 NON-PRECISION APPROACH

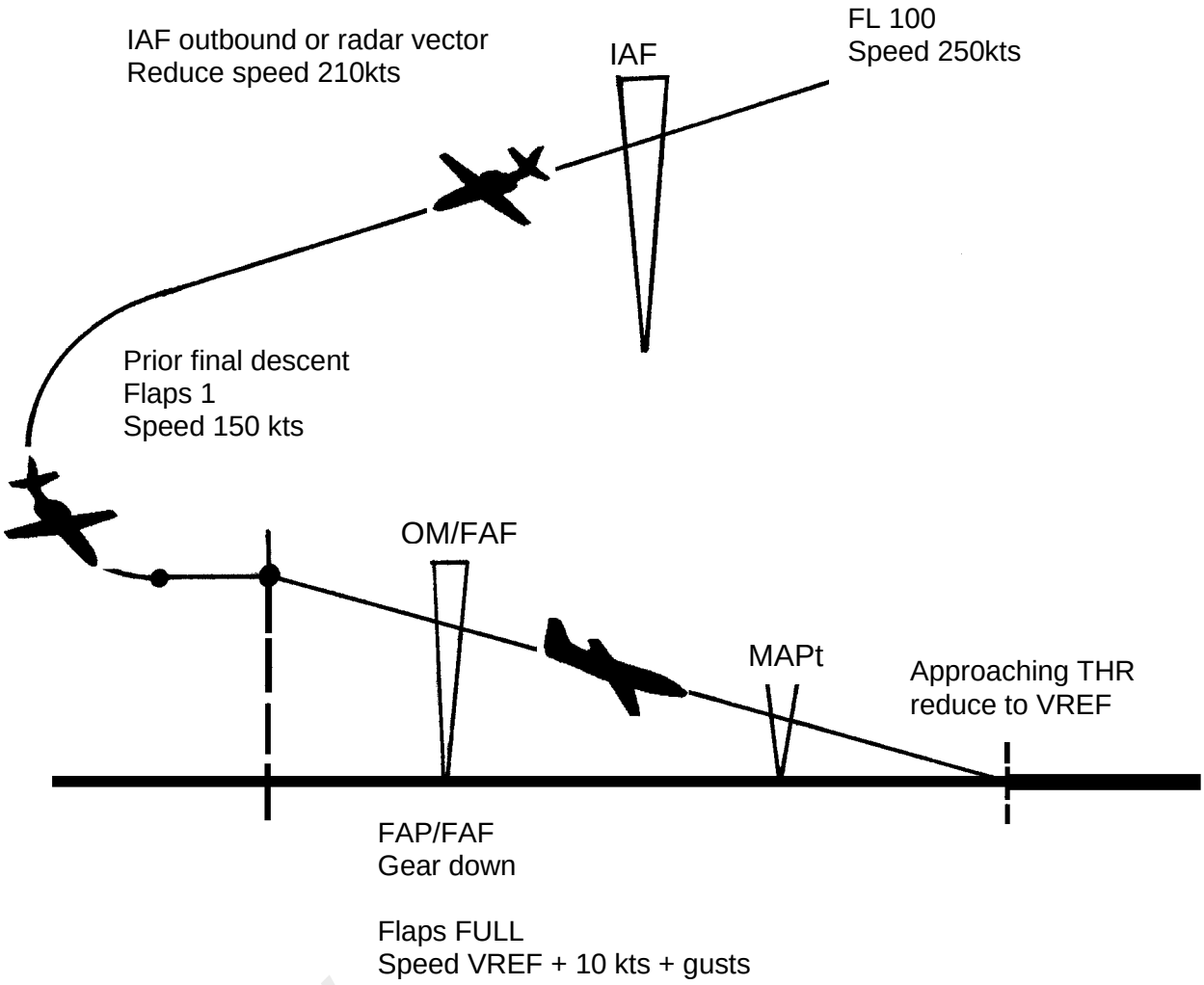
Phase	PF	PNF [PM]
IAF outbound	□ Reduce speed 160 KTS	
- On heading/RV to intercept final track order:	**"FINAL NAV SETUP"**	□ Perform **"FINAL NAV SETUP COMPLETED"**
Within 5° of final track (AP OFF)	**"ESTABLISHED"** **"SET HEADING BUG ON (WINDCORRECTED) FINAL …°"**	**"CHECKED"** □ Perform **"HEADING BUG SET"**
1 NM prior leaving intermediate approach altitude	□ Check speed below 200 KTS **"FLAPS 1"** □ Reduce speed to 160 KTS **"PRESELECT G/A ALTITUDE"**	□ check speed below 200 kts and select flaps 1, when flap position indicator shows Flaps 1: **"FLAPS 1 SET"** □ set G/A altitude **"XXXX FT IS PRESELECTED"**
In time to be established at 1.000 ft AAL	**"GEAR DOWN"**	□ Check speed below 181 kts, perform**,** when three greens: **"GEAR IS DOWN"**
	"FLAPS FULL" **"SPEED Vref +5"** □ Reduce final approach speed **"FINAL CHECK"**	- Check speed below 157 kts, perform, when flap position indicator shows full: "**FLAPS FULL SET**" **"SPEED IS ....."** Perform the **FINAL** Checklist **"FINAL CHECK COMPLETED"**
At Final Approach Fix	**"CHECK TIME"**	□ start timing, check altitude versus OM altitude, check speed and callout: **"MINIMUM IS XXX FT OUTERMARKER CHECK COMPLETED"**

At 500ft RA	**"500"**	**"CHECKED"**
100ft above minimum At MDA	**"APPROACHING MINIMUM"** **"MINIMUM"**	□ Lookout for Approach or RWY lights or RWY-markings
If sufficient visual cues in sight latest at MAPt	**"LANDING"** □ continue to land	**"APPROACH LIGHTS / RWY IN SIGHT"** □ stay on instruments down to landing and call out any deviation
If no sufficient visual cues in sight at MAPt	**"GO AROUND"** □ Perform duties for go around	**"TIME ELAPSED"** or **"MISSED APPROACH POINT"** □ Perform duties for go around

COMMON ERRORS (PRECISION/NON PRECISION APPROACHES):

- Weak preplanning combined with an insufficient briefing.
- Insufficient preparation for approach (incorrect navigating on own line up, too high speed, too high altitude, …)
- Insufficient ROD during approach resulting in excessive ROD shortly before MAPt.
- Too late reduction of ROD before leveling off at MDA.
- Too late and too small correction out of an off-centerline position
- Too large track corrections close to NavAid.
- After "RWY in sight" aligning of aircraft with RWY-centerline instead of maintaining crab angle during crosswind operation.
- Unstabilized condition on short final just after "RWY in sight".
- Large pitch and bank correction on short final, especially in low visibility.
- Missing time checks.
- Descending below minimum.

Typical non-precision approach



Note 1: In gusty wind conditions increase VREF by half of gust factor in excess of 5kts, max 15 kts increment.

12.04 CIRCLING APPROACH

The initial part of the approach will be conducted in accordance with the PRECISION or NON-PRECISION APPROACH profile as appropriate down to circling altitude.

At the missed approach point (MAPt) or by best judgment turn left/right by 45° for 45", to be wind corrected, and join the downwind leg. Continue as for a traffic pattern.

For a circling approach maintain the NAV setting as for the IMC part of the approach. Configuration for IMC part is Flaps 1 and gear down. Complete final check (with Flaps Full) on base turn.
The PNF [PM] shall assist the PF by checking flight and performance instruments on a regular basis as well as looking outside, checking position, speed and sink rate.

When the approach leads rectangular to the runway, continue heading for 20 seconds (wind corrected) after passing overhead the runway, before turning onto the downwind leg. For the downwind turn ahead of the runway start at three times the radius of turn [$TAS^2/(\tan \beta * 9{,}81)$] before the runway.

TAS	80	100	120	150	170	200	250	300	350	400	450
Bank	12°	15°	18°	22°	25°	25°	25°	25°	25°	25°	25°
turn radius (NM)	0,42	0,53	0,64	0,80	0,90	1,25	1,95	2,81	3,83	5,00	6,33

Single engine approaches follow the same flight profile, however, under certain atmospheric conditions (high density altitude) combined with high aircraft weight, maximum power may be needed to maintain level flight (Flaps 1, gear down => consider gear retraction or delayed extension until short before leaving circling altitude).

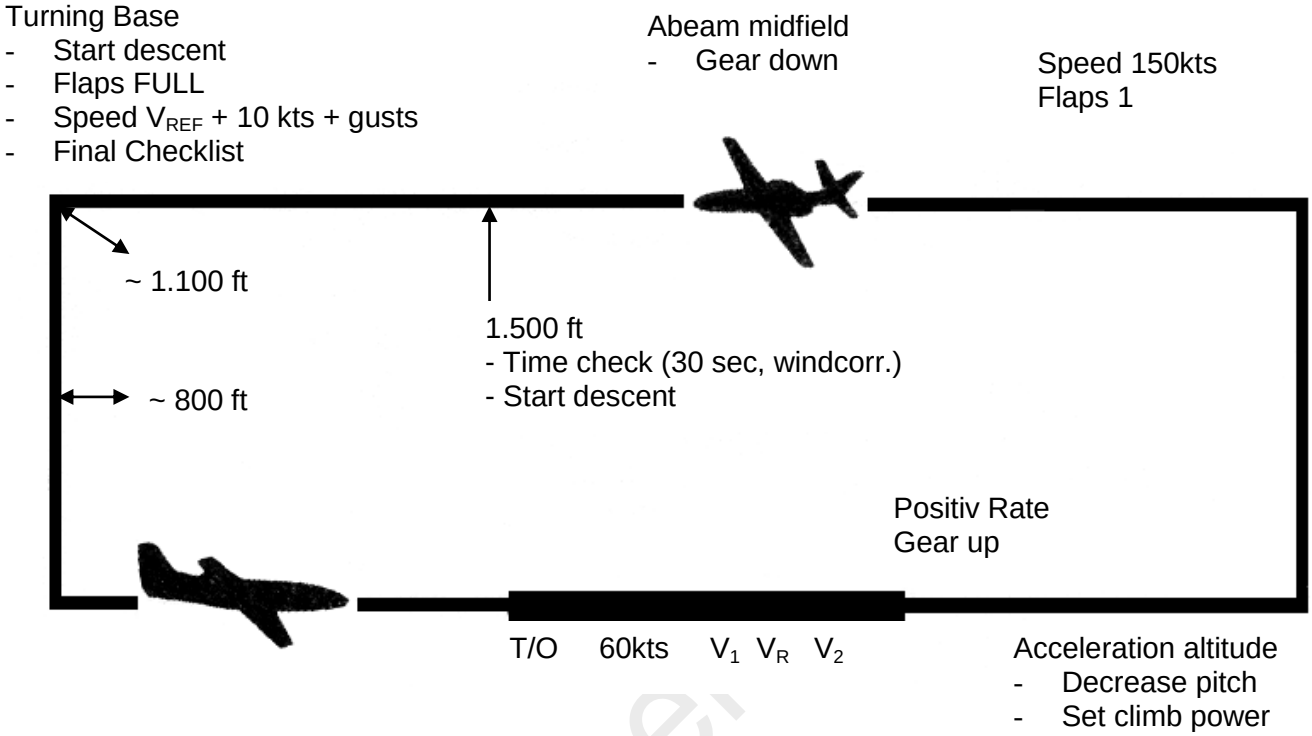
If a missed approach is executed from a circling approach, the initial turn should be towards the RWY while initiating a climb, than follow the published missed approach procedure for the active instrument runway or as briefed and coordinated with ATC.

Note: Remember the PIC authority to deviate from any clearance/rule in case of emergency.

COMMON ERRORS:

- Insufficient preplanning and briefing
- Wrong configuration and speed
- Forgetting time checks
- Not leveling off at circling MDA
- Too conservative break off after field in insight
- Positioning too close or far on downwind (general)
- Positioning too close in low visibility conditions
- No wind correction
- Too high and fast on final

12.05 Typical Traffic pattern (1.500 ft AAL)



Note 1: In gusty wind conditions increase V_{REF} by half of gust factor in excess of 5 kts, but to a maximum of 15 kts. increment.

COMMON ERRORS IN TRAFFIC PATTERN:

- Failing to use correct method (M I, M II)
- Failing to look out frequently
- Too far away or too close to RWY on downwind
- Failing to establish wind correction
- Flying base leg too low at excessive speed
- Failing to establish a low wing condition when reducing crab shortly before touchdown

03.13 Go around

13.01 General

A go around is a normal procedure which should be applied without hesitation if required or deemed necessary.

The decision for a go-around remains the duty of either crew member. Whenever an approach becomes unstable or even unsafe, a go-around shall be initiated. The execution of the go around is the duty of the PF.

A go around has to be initiated:

- When executing a precision approach procedure immediately upon reaching the DH/DA and no sufficient runway reference available.

- When executing a non-precision approach on passing the missed approach point (MAPt, e. g. middle marker, DME fix, time elapsed, etc.) and no sufficient runway reference available.

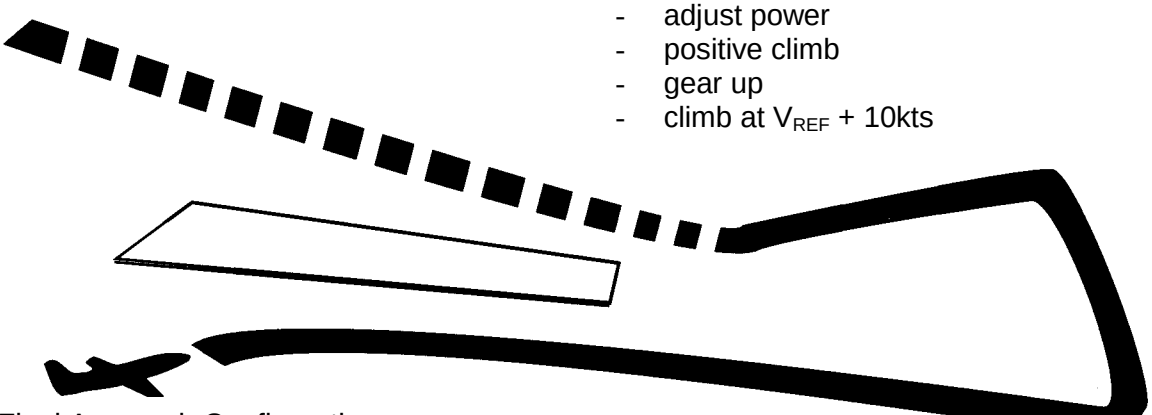
Simultaneously apply go-around power, call for Flaps 1 and rotate towards 10° to 12° degrees pitch attitude. At a positive rate of climb call “gear up” and climb at V_{APP}. Thereafter continue with standard acceleration and according missed approach procedure.

As the saying goes: *“The go around is a part of the flight, just sometimes substituted by a landing”*

13.02 Typical G/A procedure (Both engines)

Acceleration altitude
- continue acc. normal climb procedure

Go around:
- apply go around power (approximate)
- initial pitch aprox. 10° to 12°
- select flaps 1
- adjust power
- positive climb
- gear up
- climb at V_{REF} + 10kts



Final Approach Configuration

Note 1: Maintain Flaps 1 until passing acceleration altitude

Note 2: Single engine go around: Rotate only to 7° nose up (minimum speed V_{REF})

Phase	PF	PNF [PM]
Initial GO-AROUND	**"GO AROUND, POWER, FLAPS 1"** PF advances the power levers to an approximate go around power setting **"SET G/A POWER"** - Rotate smoothly to pitch approx. 10° to 12°	- Perform retraction to Flaps 1 - adjust power levers - check flaps 1 set **"FLAPS 1 SET"** Adjust G/A (T/O) Power. **"G/A POWER SET"** - check speed
When positive ROC	Adjust pitch attitude to achieve a speed not less than V_{APP} + 5 kts as the flaps are retracted to 1 **"POSITIVE RATE, GEAR UP"**	- check positive ROC - select gear up **"GEAR IS UP "**
When 1500ft AGL, or higher and climb established	Continue normal acceleration as described for take off.	

COMMON ERRORS:

Pilot Flying:
- Rotation too smooth, resulting in excessive altitude loss
- Rotation without sufficient power increase
- Over rotating, resulting in loss of airspeed
- Initial rotation to a too low attitude
- Failing to fly the attitude indicator
- Failing to fly the prescribed missed approach procedure

Pilot Monitoring:
- Wrong sequence of drill items
- Failing to establish go around power/thrust
- Failing to set correct flight director modes
- Failing to monitor PF on attitude, power, speed, ROC
- Working too fast (creates errors)
- Calling out incorrect speeds

NOTES:

No swing - over must be accepted in IMC. If in VMC a swing - over may be accepted provided no turn onto final is made below 500 ft AGL.

The Final Check will not be continued beyond the flaps until the flaps have completed their travel to the selected position.

Threshold shall be crossed on GP or if not available, at 35 to 50 ft wheel height (RA).

03.14 Landing

14.01 General

During landing maximum reverse thrust may be used down to 60 kts there after reduce reverse to beta range in order to avoid Foreign Object Damage (FOD). Maintain beta range until taxi-speed is reached.

COMMON ERRORS UPON LANDING:

- Unstabilized short final
- No speed awareness
- Failing to keep the aircraft aligned with centerline
- Start of flare too late
- Floating to achieve a smooth touchdown resulting in a long landing

14.02 AFTER LANDING

Once down and stabilized on the runway center line the CM 1 (if not PF) will take over controls. As soon as the RWY is vacated, the CM 2 will complete the after landing checklist by the order of the CM 1.

NOTES:

- If the CM 2 is PF, he should be allowed to decelerate the aircraft to taxi speed.

Phase	CM1	CM2
On leaving the runway	Switches Landing Lights Off and Taxi lights On **"AFTER LANDING CHECK"**	Perform **AFTER LANDING** Checklist **"AFTER LANDING CHECK COMPLETED"**

14.03 SHUTDOWN

When the aircraft has come to a complete stop at the parking position and the parking brake is set, the CM 1 will shut down the engines according the checklist.
The CM 2 completes the Parking Check even without specific order by the CM 1.

03.20 Characteristic speeds

Beech 200

(not to be used in airplane, artificial speeds for MCC only!, V_1 range is runway dependant! Calculate approach speeds according SOP, add min. 5 kts to V_{REF})

Takeoff Speeds Flaps 0			
WEIGHT	V_1	V_R	V_2
12,500	94-97	103	121
12,000	93-96	102	119
11,500	92-95	101	117
11,000	91-94	100	115
10,500	90-93	99	113
10,000	89-92	98	111
9,500	88-91	97	110
9,000	87-90	96	108

Takeoff Speeds Flaps 1			
WEIGHT	V_1	V_R	V_2
12,500	91-94	98	106
12,000	90-93	97	105
11,500	89-92	96	104
11,000	88-91	95	103
10,500	87-90	94	102
10,000	86-89	93	101
9,500	86-88	92	100
9,000	86-87	91	99

Cruise climb speeds:

$V_{0 \text{ to } 10.000 \text{ ft}}$ 150 kts IAS
$V_{10.000 \text{ to } 20.000 \text{ ft}}$ 140 kts IAS
$V_{20.000 \text{ to } 25.000 \text{ ft}}$ 130 kts IAS

App & G/A	Flaps 1	Flaps Full	Flaps 1	FLAPS 0
WEIGHT	**V_{REF}**	**V_{REF}**	**V_{GA}**	**V_{GA}**
12.500	106	103	109	121
12.000	105	102	108	119
11.500	104	101	107	117
11.000	103	99	106	115
10.500	102	98	105	113
10.000	101	96	104	111
9.500	100	95	103	110
9.000	99	93	102	108

V_{LE} 181 kts IAS
$V_{LO \text{ retract}}$ 163 kts IAS
$V_{LO \text{ extend}}$ 181 kts IAS
$V_{FE \text{ Flaps 1 (40 \%)}}$ 200 kts IAS
$V_{FE \text{ Flaps Full (100\%)}}$ 157 kts IAS
V_{MO} / M_{MO} 259 kts IAS /.52 Mach
V_a 181 kts IAS
V_{MCA} 86 kts IAS

Max range glide speed 135 kts IAS
Max CWC (demonstrated) 25 kts IAS
Max Reverse speed 95 kts IAS

03.21 Operation of FD/AP

21.01 Description

The system is split into four units, the FMA on top of the PFD, the NAV system command switch on top of the altitude selector, the forward EFIS control panel and the aft FD/AP control panel on the pedestal.

21.02 FMA

The FMA provides visual information of the FD/AP system status.

FD: The Flight Director is engaged. Two different presentation modes are available, the Crossbar (widely used among airliners) and the V-bar (mainly on executive airplanes).

NAV: The navigation hold mode is armed, or when combined with CPLD the navigation hold mode is coupled and the course followed by the FD.

ARM: This shows that NAV or APP mode is armed.

ALT: The preselected and armed altitude is captured, or ALT hold has been selected on the FD/AP panel.

AP: The autopilot is engaged

HDG: Heading mode is active and the heading bug is the primary means of lateral navigation for the FD.

APPR: This mode will allow the FD to command lateral (VOR track, LOC course) and vertical (ILS GS) flight paths. The glideslope however requires the LOC course to be coupled first, before it can be captured.

CPLD: Indicates, that a lateral mode has been coupled and that a vertical mode can be captured.

GS: The glideslope has been captured and is tracked.

GA: This mode is used for go-around, but also for the take off. It provides vertical navigation for go around or take off rotation to the safe climb out speed.

BC: The backcourse of a localizer has been coupled.

A: Airway (almost not existing) or Inner marker

O: Outer marker

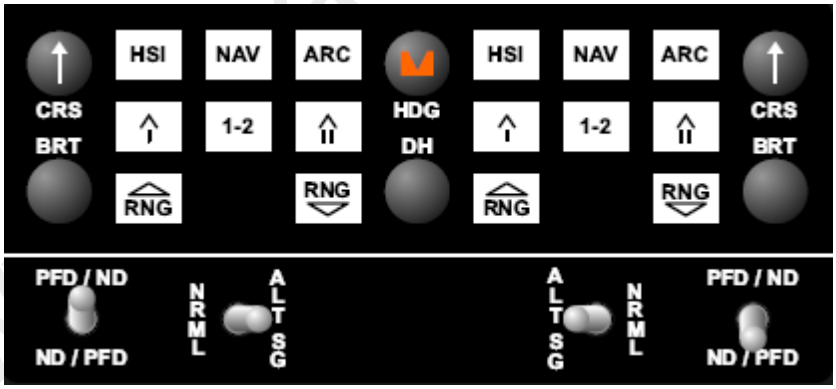
M: Middle marker

TRIM: Electric trim is disengaged. Trim test has to be performed.

21.03 NAV SYSTEM COMMAND SWITCH

This switch hast to be set to the PF at all times. All armed modes will take this command setting into their priority and all coupled or capture modes are engaged according this logic.
When handing over controls for a short period, you may keep the switching, but be aware of the system behaviour!
When handing over controls for a prolonged period, the system has to be switched to the new PF. Be careful not to switch during any lateral or vertical mode engagement period, as the AP will go off during switching.

21.04 EFIS CONTROL PANEL



The EFIS control panel consists of the single heading bug control 

in the middle, being connected to both heading bugs simultaneously and the DH setting knob just beneath it. The DH setting knob is used to set the DH into the NDs and to arm the DH alert pop up in the PFD. It has to be set to zero after landing. It can be used as a reminder on precision and non-precision approaches and is necessary for DH-based precision approaches, actually Cat II.

Left and right of them are the two identical EFIS control switches for the left (CM 1) and right (CM 2) side.
CRS: This knob turns the corresponding CDI to the selected course.

BRT: This knob regulates the brightness.

HSI: Provides the ROSE mode on the ND

NAV: Provides the NAV mode on the ND

ARC: Provides the ARC mode on the ND

Toggles the single pointer through all available NAV sources (VOR 1 or 2, NDB 1 or 2)

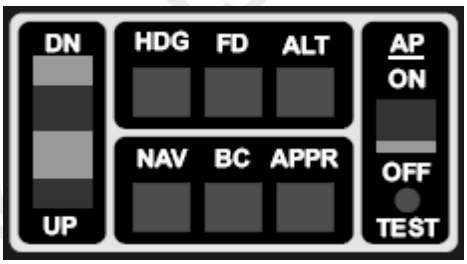
1-2 Toggles the NAV sources (VOR 1 or 2, ILS 1 or 2)

Toggles the double pointer through all available NAV sources (VOR 1 or 2, NDB 1 or 2)

RNG Increase range on ND in NAV or ARC mode

RNG Decrease range on ND in NAV or ARC mode

21.05 FCU FLIGHT CONTROL UNIT



The pitch control toggle switch is located on the left side of the FCU panel. This switch provides a down or up signal to the FD. There is no accurate rate setting possible, therefore it is advisable to use the CWS/Pitch Sync instead.

On the right hand side you have the autopilot switch and aft of it the system test switch. In order to use the AP, the FD has to work first, as the FD provides the guiding signals for the AP.

FD is first to be switched on when you intend to use the system

HDG will engage the heading mode. The shortest way to the set heading will be shown by the FD. Be careful when turning close to 180°, as the FD will change direction when you turn the heading bug beyond 180°.

ALT will immediately engage the altitude hold mode, out of any other vertical mode, except

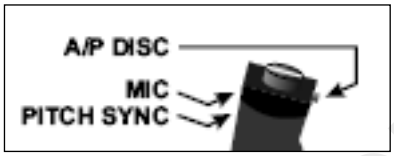
in altitude hold mode. In that case, it will disengage the altitude hold mode and you may arm a new altitude in the preselection window. If you do not disengage the altitude hold mode, the FD tends to return to the previous altitude even with a new altitude armed!

NAV arms the lateral mode provided by the HSI in command (NAV 1 or 2).

BC arms the LOC back course approach

APPR arms the LOC of the HSI in command and on coupling, the GS will be automatically armed too.

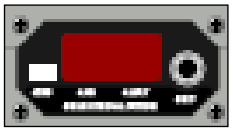
21.06 Yoke controls



The A/P DISC switch on the inner side of the control wheel will disconnect the AP and the electrical trim system. By pushing the knob a second time you recover the electrical trim.

The PITCH SYNC button is the upper button on the control wheel and provides a Control Wheel Steering logic. With the AP on, you may not use the control wheel steering to over steer the AP, unless you push the PITCH SYNC button and hold it. While holding the button, you may vary the pitch mode as desired, but you have to care about the lateral signals by the FD too. This way is the best to start and change any climb or descent. Just pull or push the control wheel to the desired pitch attitude with the PITCH SYNC button pushed, release the button and the AP will follow the new pitch order.

21.07 ALT preselector



The altitude preselector to the right of the Comm/Nav unit provides an aural and visual altitude alert plus the altitude information to the FD/AP.

The altitude can be dialled in by use of the rotary switch to the left in hundred feet increments. Deselect ALT first as the AFS will keep the old altitude!

The white push button on the left side arms the alert and FD modes. When armed, the lower left light shows orange. On alert, the right light comes on in orange.

03.22 General information

TBA

03.40 Expanded flight checklist

FLIGHT DECK PREPARATION

CM 1:

1. Required Papers and Documents ..... CHECKED
2. Seats and Rudder Pedals ..... ADJUST
3. Parking brake ..... SET
4. Battery Master switch ..... ON
5. Instrument lights ..... ON
6. DC Volt/Loadmeters ..... CHECK (MIN 23 V)
7. Fuel Panel CB's ..... ALL IN
8. Fuel Panel ..... CHECK / SET
   - a. *Fuel Tank switches* — *ON*
   - b. *Standby pumps* — *ON*
   - c. *check FUEL PRESS annunciations* — *OFF*
   - d. *Standby pumps* — *OFF*
   - e. *check FUEL PRESS annunciations* — *ON*
   - f. *Crossfeed switch* — *LEFT*
   - g. *L StandBy Pump* — *ON*
   - h. *L Fuel Tank switch* — *OFF*
     - i. *check FUEL CROSSFEED annunciation* — *ON*
     - ii. *L FUEL PRESS annunciation* — *OFF*
   - i. *Crossfeed switch* — *RIGHT*
   - j. *R StandBy Pump* — *ON*
   - k. *R Fuel Tank switch* — *OFF*
   - l. *L StandBy Pump* — *OFF*
   - m. *L Fuel Tank switch* — *ON*
     - i. *check FUEL CROSSFEED annunciation* — *ON*
     - ii. *R FUEL PRESS annunciation* — *OFF*
   - n. *R StandBy Pump* — *ON*
   - o. *R Fuel Tank switch* — *ON*
   - p. *Crossfeed switch* — *OFF*

9. Captains Instrument Panel ..... CHECK
   a. *Avionic Master Power* — *ON*
   b. *Inverter* — *1*
   c. *Instruments* — *NORMAL INDICATION*
   d. *Prop sync switch* — *OFF*
10. Captains Subpanel ..... CHECK
   a. *Microphone selector switch* — *NORMAL*
   b. *Avionics master switch* — *OFF*
   c. *Inverter switch* — *OFF*
   d. *Ignition and engine start switch* — *OFF*
   e. *Ice vane switches* — *AS REQUIRED*
   f. *Light switches* — *OFF*
   g. *Ice protection switches* — *OFF*
11. Power Levers ..... IDLE
12. Prop Levers ..... FEATHER
13. Condition Levers ..... FUEL CUT OFF
14. Rudder and Aileron Trim ..... ZERO / ZERO
15. Elevator Trim ..... SET FOR TAKE OFF
16. Annunciators ..... PRESS TO TEST
   a. *Check all annunciators illuminated, master warning & master caution flashing*
   b. *Push left master warning switch and check master warning lights both off.*
   c. *Push left master caution switch and check master caution lights both off*

CM 2:

1. Seats and Rudder Pedals ..... ADJUST
2. Landing Gear Handle ..... DOWN/ 3 GREEN
3. Alternate Gear Extension System ..... SECURED
4. Avionics master switch ..... OFF
5. Right Circuit Breakers Panel ..... CHECKED
6. Upper Circuit Breakers Panel ..... CHECKED
7. Oxygen Pressure ..... CHECKED
8. Oxygen Supply System ..... PULL ON
9. Emergency Equipment ..... CHECK
   a. *Flashlight* — *CHECK*

10. Avionics Master Switch ..... ON
11. Inverter 1
12. ATIS ..... NOTED
13. First Officers Instrument Panel ..... CHECK
    a. *Instruments* — *NORMAL INDICATION*
14. First Officers Sub-panel ..... CHECK
    a. *Bleed air valve switches* — *ENVIR OFF*
    b. *Microphone selector switch* — *NORMAL*
    c. *Landing gear motor circuit breaker* — *IN*

CREW AT STATION

1. Preflight Inspection ..... COMPLETED ..... CM 1
2. Seats ..... ADJUSTED ..... CM 1/2
3. Weight/CG ..... CHECKED/WITHIN LIMITS ..... CM 2
4. Controls ..... FREE ..... CM 1/2
5. Magnetic Compass ..... CHECKED ..... CM 1/2
6. Crew Oxygen Masks ..... CHECK ..... CM 1/2
7. Annunciators ..... CHECK ..... CM 1/2
    a. *INVERTER annunciator* — *OFF*
    b. *FUEL PRESS annunciators* — *ON*
    c. *OIL PRESS annunciators* — *ON*
    d. *BLAIR FAIL annunciators* — *ON*
    e. *DC GEN annunciators* — *ON*
    f. *BLAIR OFF annunciators* — *ON*
8. Stall Warning ..... TEST/ON ..... CM 1
9. Fire Detectors ..... TEST ..... CM 2
    a. *When the TEST SWITCH is in any one of the three flame-detector-test*
        i. *MASTER WARNING flashers* — *ON*
        ii. *L/R fire warning annunciation* — *ON*
        iii. *L/R ENG FIRE - PUSH TO EXT* — *ON*
    b. *Rotate the TEST SWITCH to each of the two positions*
        i. *RIGHT EXT and LEFT EXT and verify:*
        ii. *illumination off amber D-light & green OK light on each fire extinguisher activation switch*
    c. *Fire Detector Switch* — *OFF*
10. DC Volt/Loadmeters ..... CHECK VOLTAGE ..... CM 2

11. Landing Gear Lights	Push to TEST	CM 2
12. Altimeters	CHECKED	CM 1/2
13. Takeoff Performance Data	CHECKED	CM 2

= End of checklist =

BEFORE ENGINE START

1. Startup clearance	RECEIVED		CM 2
2. Clear Signal	RECEIVED		CM 1
3. Avionics Master	OFF		CM 1
4. Inverter	OFF		CM 1
5. Prop Levers	FEATHER		CM 1
6. Nav Lights	ON		CM 2
7. Beacon	ON		CM 2
8. Parking Brake	SET		CM 1

= End of checklist =

ENGINE START (Battery) -> CM 1 (CM 2 observes)

1. Right Ignition Engine Start	ON
2. Right Condition Lever	LOW IDLE *(RPM: MIN 12%, check FF)*
3. ITT & N1	MONITOR (1000° max)

CAUTION

If no ITT rise is observed within 10 seconds, move the Condition lever to CUT-OFF.
Allow 60 seconds for fuel to drain and starter to cool.
Ignition & Engine Start Switch - STARTER ONLY for 20 seconds; than OFF

4. Right Oil Pressure	CHECK
5. Condition Lever	HIGH IDLE
6. Right Ignition/Start Switch	OFF (50% Percent RPM OR ABOVE)
7. Right Generator Switch	RESET (for 1 sec) / ON
8. DC Volt/Loadmeter	CHARGE BAT UNTIL MIN 30%
9. Left Ignition/Start Switch	ON
10. Left Condition Lever	LOW IDLE (RPM: MIN 12%, check FF)
11. ITT & N1	MONITOR (1000° max)
12. Left Oil Pressure	CHECK
13. Left Ignition/Start Switch	OFF (50% Percent RPM OR ABOVE)
14. Left Generator	RESET / ON
15. Right Condition Lever	LOW IDLE
16. Propeller Lever	FULL FORWARD
17. Engine Instruments	CHECK

= End of checklist =

AFTER ENGINE START

1. Generators ..... ON ..... CM 2
2. Inverter ..... CHECKED ..... CM 1/2
   a. *Set Inverter switch to number 2*
      i. *check ADI working*
      ii. *check voltage 105 – 120 V*
      iii. *frequency 380 – 420 Hz*
   b. *Set Inverter switch to number 1*
      i. *check ADI working*
3. DC Volt/Loadmeters ..... CHECKED ..... CM 1/2
   a. *within 10 %*
4. Avionics Master Power Switch ..... ON ..... CM 1
   a. *check radios & avionics powered*
5. Air Condition & Pressurization ..... CHECKED & SET ..... CM 1/2
   a. *Bleed air valve switches* *OPEN*
   b. *Check pneumatic pressure and suction gauges (green arc)*
   c. *Cabin altitude selector ACFT ALT set cruise altitude plus 1000 ft*
6. Annunciation Lights ..... NORMAL ..... CM 1/2
   a. *- Check that no lights except BATTERY CHARGE plus ICE VANES EXT lights on, if ICE VANE Switches are ON.*
7. Instruments ..... CHECK ..... CM 1/2
8. Compasses ..... CHECKED ..... CM 1/2
   a. *against magnetic compass*
9. Autopilot Test ..... PERFORMED ..... CM 2
10. Electric Elevator Trim Control ..... CHECK ..... CM 1/2
    a. *Both pilot switches* *CHECK OPERATION*
11. Trim Tabs ..... SET for T/O ..... CM 2
12. Flaps ..... SET for T/O ..... CM 2
13. CB's ..... ALL IN ..... CM 2
14. Departure Briefing ..... PERFORMED ..... PF
15. Taxi lights ..... ON ..... CM 1

= End of checklist =

TAXI CHECK

1.	Parking Brakes	RELEASED	CM 1
2.	Brakes	CHECKED	CM 1/2

a. CM 1 checks brakes, calls "Brakes checked", hands over brake control to CM 2 who checks the brakes to work and calls "Brakes checked", handing over controls of the brakes thereby

3.	Flight Instruments	CHECKED	CM 1/2

a. As per basic training

4.	Avionics	SET	PF
5.	Bleed Air Valves	OPEN	CM 2
6.	Fuel Quantity	CHECK	CM 2
7.	Engine Instruments	CHECK	CM 1/2

= End of checklist =

BEFORE TAKE OFF

(when ready & next for line-up)

1.	Annunciation Lights	OFF/CONSIDERED	CM 1/2
2.	Ice Protection	AS REQUIRED	CM 1
	a. Prop Anti Ice	*AS REQUIRED*	
	b. Pitot Heat Switches	*ON*	
3.	Flaps	RECHECK	CM 1/2
4.	Trim	RECHECK	CM 1/2
5.	Flight director	ON/MODES CHECKED	PF
	a. Altitude preselect	ARMED	
	b. GA switch	PUSH	
	c. HDG	ENGAGED	
6.	Lights	AS REQUIRED	CM 1
	a. Taxi/Wing	*OFF*	
	b. NAV	*ON*	
	c. Beacon	*ON*	
	d. LDG	*ON (when aligned with runway)*	
7.	Condition Lever	HIGH IDLE	PF
8.	Transponder	ON/ALT	CM 2

= End of checklist =

CLIMB CHECK

1.	Gear	UP	(PNF/PM)
2.	LDG/TAXI LTS	OFF	(PNF/PM)
3.	Flaps	ZERO	(PNF/PM)
4.	Climb Power	SET (ITT, torque, N1 limits)	(PF)
5.	Propeller	1900 RPM	(PF)
6.	Prop Sync	ON	(PNF/PM)
7.	Ignition	OFF	(CM 1)

On passing FL 100 or at cruising altitude when lower:

8.	Pressurization	CHECKED	PNF
9.	Engine Instruments	MONITOR	PF/PNF
10.	Annunciations	OFF/CONSIDERED	PF/PNF

= End of checklist =

CRUISE CHECK

1.	Cruise Power	SET (cruise pwr table)	PNF
2.	Fuel	CHECK	PNF

a. note at least once per hour on OFP and crosscheck FOB with BURN against original fuel on departure

3.	Pressurization	CHECK/RST as appropriate	PNF
4.	Engine Instruments	CHECK periodically	PNF

= End of checklist =

DESCENT CHECK

1	Pressurization	SET	PNF

a. Set Cabin Altitude Selector knob as per PRESSURIZATION CONTROLLER SETTING FOR LANDING graph or

b. So that “CABIN ALT” dial indicates landing field PA plus 500 ft.

2	Power	AS RQD (for ROD)	PF

= End of checklist =

APPROACH CHECK

1.	Prop Sync	OFF	CM 1
2.	Altimeters	xxxx/yyyy ft	PF/PNF
3.	Pressurization	RECHECK	PF/PNF
4.	Landing Lights	ON	PNF

= End of checklist =

OUTER MARKER CHECK

(by heart)

1.	Time	CHECK	PF/PNF
2.	Altimeters	CHECK QNH/ALTITUDE	PF/PNF
3.	MAP altitude	SET	PNF
4.	FD/AP mode	CHECK	PF/PNF
5.	Minimum	CALL	PF

FINAL CHECK

1.	Gear	DOWN	PNF
2.	Flaps	FULL	PNF
3.	Ignition	ON	CM 1
4.	Condition lever	HIGH IDLE	PF
5.	Propeller lever	FULL FORWARD	PF

After touchdown (by heart):

6.	Power levers	REVERSE	PF

= End of checklist =

AFTER LANDING

1.	Condition levers	LOW IDLE	PF
2.	Ignition	OFF	CM 1
3.	Lights	AS REQUIRED	CM 1
4.	Ice Protection	AS REQUIRED	CM 1
5.	Transponder	STBY/OFF	CM 2
6.	Flaps	ZERO	CM 2
7.	FD	OFF	CM 2
8.	DH marker	OFF	CM 2
9.	Electrical Load	OBSERVE LIMITS	CM 1/2

= End of checklist =

PARKING CHECK

1.	Parking Brake	SET/OFF	CM 1
2.	Avionics Master Switch	OFF	CM 1
3.	Inverter	OFF	CM 1
4.	Bleed Air Valves	INSTR & ENVIR OFF	CM 2
5.	ITT	STABILIZED	CM 1
6.	Condition Levers	FUEL CUT OFF	CM 1
7.	Propellers	FEATHERED	CM 1
8.	Light Switches	OFF	CM 2
9.	Oxygen Supply Sys Ready	PUSH OFF	CM 2
10.	Generator Switches	OFF	CM 1
11.	Battery switch	OFF	CM 1

= End of checklist =

03.45 Flight checklist

Intentionally deleted (for our students capacity)

- End of Chapter –